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Northrose

A New Special-Purpose Rice Variety For Arkansas

By T. H. JOHNSTON,[2] G. E. TEMPLETON, J. P. WELLS, and S. H. HENRY

INTRODUCTION

Northrose (C.I. 9407) is an early, smooth-hulled, medium-grain rice variety released jointly by the Arkansas Agricultural Experiment Station and the Crops Research Division, Agricultural Research Service, U. S. Department of Agriculture. Foundation and Registered seed were distributed from the Rice Branch Experiment Station at Stuttgart for seeding in Arkansas in 1962. Northrose is not considered as a general replacement for Nato, the predominant early-maturing, medium-grain variety, but as a special-purpose variety for growing where its earliness and high degree of lodging resistance are urgently needed.

Nato often lodges severely on "new-ground"; so the release of Northrose will help fill a definite need. In northern Arkansas growers prefer not to grow the stiff-strawed, midseason, long-grain Bluebonnet 50 variety unless they can get it seeded by May 1. Use of Northrose should safely extend the seeding date of a stiff-strawed variety in this area to June 1 or later. Northrose usually has shown more tolerance to cool fall weather than has Nato.

The most outstanding characteristics of Northrose are its short, stiff straw and high grain yields. In tests to date milled kernels of Northrose have tended to be slightly chalkier than those of Nato, and in a few cases head-rice yields of Northrose have been considerably below those of Nato. Therefore, Northrose is designated a special-purpose variety rather than a general replacement for Nato.

ORIGIN AND DESCRIPTION

Northrose was tested under the designation Lacrosse x Arkrose, C.I. 9407 (Stg 555971). The cross

T. H. Johnston

giving rise to Northrose was made at Stuttgart in 1949 by C. Roy Adair to combine desirable agronomic and disease characteristics of Lacrosse and Arkrose. Final selection was made by the senior author at the Rice Branch Experiment Station, Stuttgart, Arkansas, in 1955. The strain which was named Northrose was selected primarily on the basis of its short, stiff straw and early maturity. It is earlier and has shorter, stiffer straw than either parent and produces high grain yields.

Northrose has smooth (nonpubescent) leaves and hulls, but a few small hairs often may be seen on the tips of the grains or along the edges of the lemmas. Northrose panicles usually are larger and ripen somewhat more slowly than those of Nato. The hulls of ripening grain often have small rust-colored specks or splotches similar to those found on Arkrose hulls. This coloring gives the variety a slightly to sometimes fairly pronounced gold cast contrasted with the more "whitish" appearance of Nato.

Grains and unmilled kernels of Northrose are slightly larger and heavier than those of Nato but are smaller in all dimensions than those of Arkrose (see Table 1). Northrose averaged 19.7 per cent hulls compared with 18.6 per cent for Nato.

HISTORY

Northrose (C.I. No. 9407)
Selection No. Stg 555971

1949—Cross No. 4923A made at Stuttgart between Lacrosse C.I. No. 8985 and Arkrose

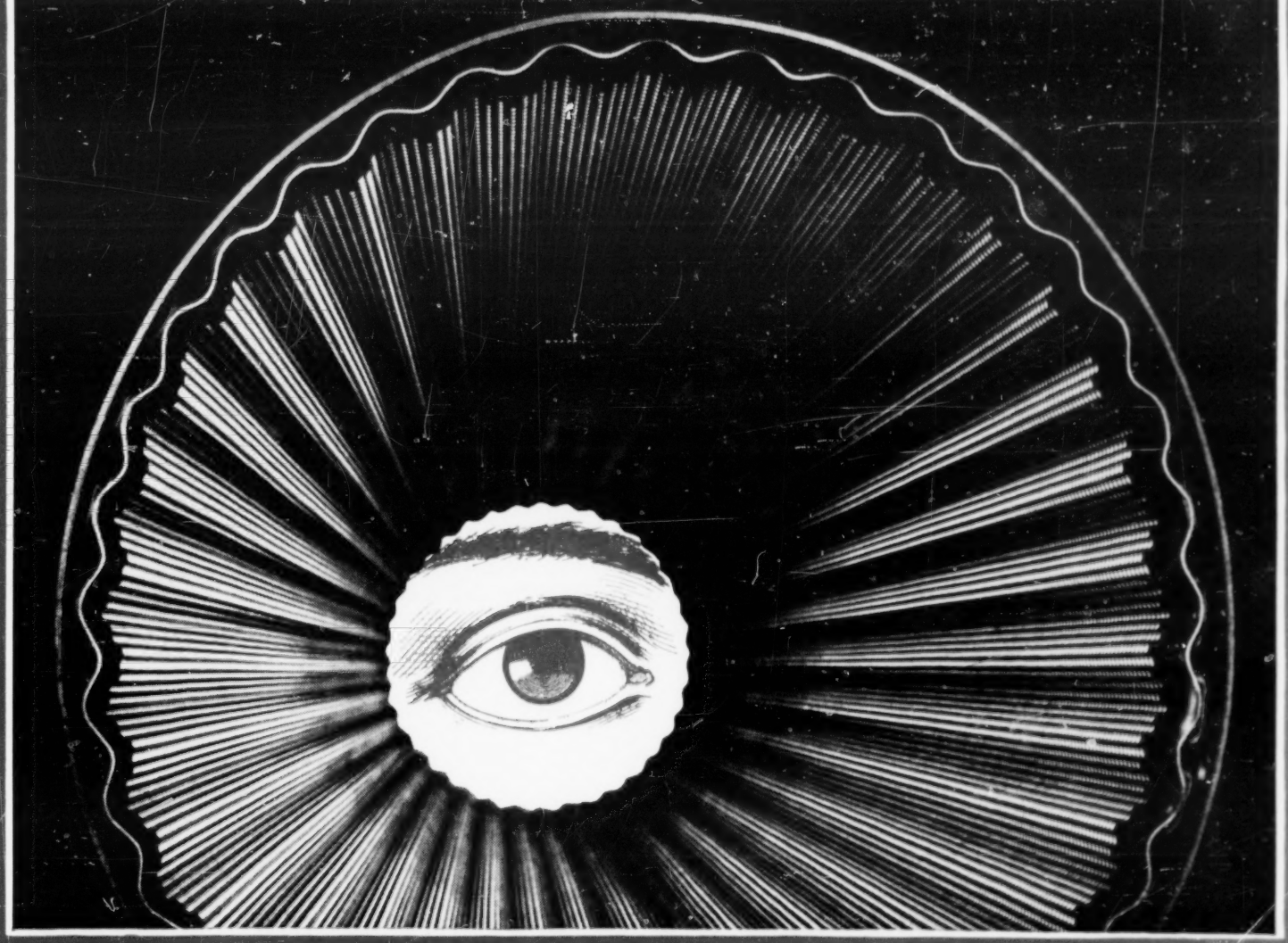
TABLE 1. Average weights and dimensions of rough and shelled grains of Northrose and other rice varieties grown in Uniform Yield Nursery, Stuttgart, Arkansas, 1959 to 1961, inclusive.

Variety and Kind	Wt. of 100 grains (gm.)	Hulls (%)	Grain Length (mm.)	Grain Width (mm.)	Grain Thickness (mm.)
Northrose					
Rough*	2.5	19.7	7.8	3.2	2.1
Brown**	1.9	—	5.8	2.7	1.9
Arkrose					
Rough*	3.1	19.8	8.4	3.4	2.2
Brown**	2.4	—	6.4	2.8	2.0
Gulfrose					
Rough*	2.5	19.6	8.0	3.2	2.0
Brown**	2.0	—	6.3	2.7	1.8
Nato					
Rough*	2.2	18.6	7.5	3.1	2.0
Brown**	1.7	—	5.8	2.6	1.7
Zenith					
Rough*	2.3	19.5	7.9	3.2	2.0
Brown**	1.8	—	6.1	2.6	1.7

*Spikelet.
**Spikelet with lemma and palea removed.

[1]Cooperative investigations, Crops Research Division, Agricultural Research Service, U.S. Department of Agriculture, and Arkansas Agricultural Experiment Station.
[2]Research Agronomist, Crops Research Division; Associate Plant Pathologist, formerly Assistant Agronomist, and Research Assistant, respectively, Arkansas Agricultural Experiment Station.

This cylinder sees red...



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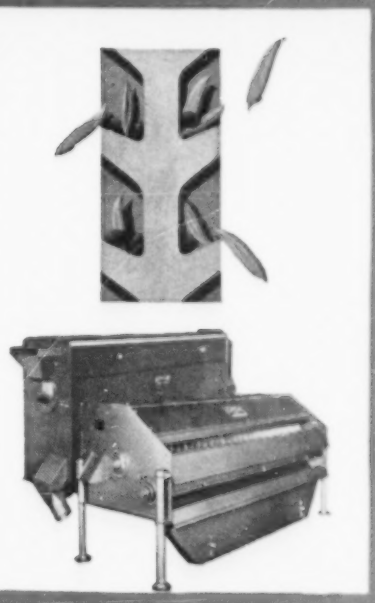
The cylinder above can be fitted in a minute into the Precision Grader—and have a steady flow of rice moving through it! Hundreds of microcalibrated perforations hold out the slightly larger red rice and let the smaller seed rice pass on through. No reciprocating screen is anywhere near as accurate! Precision Grader shells are made with perforated metal and hardened by cyanide treatment to resist wear.

Before the rice flow reaches the Precision Grader it is thoroughly cleaned of brokens, seeds and foreign material by the Disc Separator. Rotating discs with thousands of precisely formed tiny pockets pick the rice clean. Together these two rotary units—the Disc Separator and Precision Grader—give you the most compact, accurate seed rice classification system possible. Write for details today!



Pictured above: the compact Precision Grader and Disc Separator (both available in larger sizes). Cross-section view of disc at top illustrates how over-length material is rejected by series of spaced, rotating discs in Disc Separator.

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1950—Four F1 plants grown.

1951—Four F2 families grown.

1952—Twelve F3 panicle (head) rows grown and heads selected in bulk.

1953—Twenty-eight F4 hybrid selection head rows grown and 3 rows reselected.

1954—Twenty-six F5 hybrid selection head rows grown and 4 rows (32 panicles) reselected.

1955—Thirty-two F6 hybrid selection head rows grown and 5 rows saved including row 5971.

1956—Selection Stg 555971 grown in preliminary observation and yield nursery at Stuttgart.

1957—Grown in advanced yield nursery and in purification head rows from which 100 panicles were saved and 21 of 24 rows were harvested in bulk.

1958—Grown in field plot test at Stuttgart, in purification head row block (100 rows), in outlying variety test in Arkansas, and in uniform yield nursery group I at Beaumont, Texas, Crowley, Louisiana, Stoneville, Mississippi, and Stuttgart.—Showed resistance to hoja blanca in cooperative test in Cuba.

1959—Grown again in same tests as in 1958 and in date-of-seeding tests, small increase field, and 3500 Breeder Seed head rows.

1960—Grown again in same tests as in 1959 and in "high-N" test, in outlying observational plots in comparison with 15 other commercial and experimental varieties and in Breeder Seed head rows by families.

1961—Grown in same tests as in 1960 and in small observational "fields" at 11 locations in the northern half of Arkansas, again in Breeder Seed head rows by families, and in a 40-acre increase field at Stuttgart for possible release.

1962—Approved for joint release as special-purpose variety by Arkansas Agricultural Experiment Station and Crops Research Division, ARS, USDA. Named "Northrose": "North" to designate its adaptation to the **North** Arkansas rice area and "rose" since the grains tend to resemble grains of the Arkrose parent.

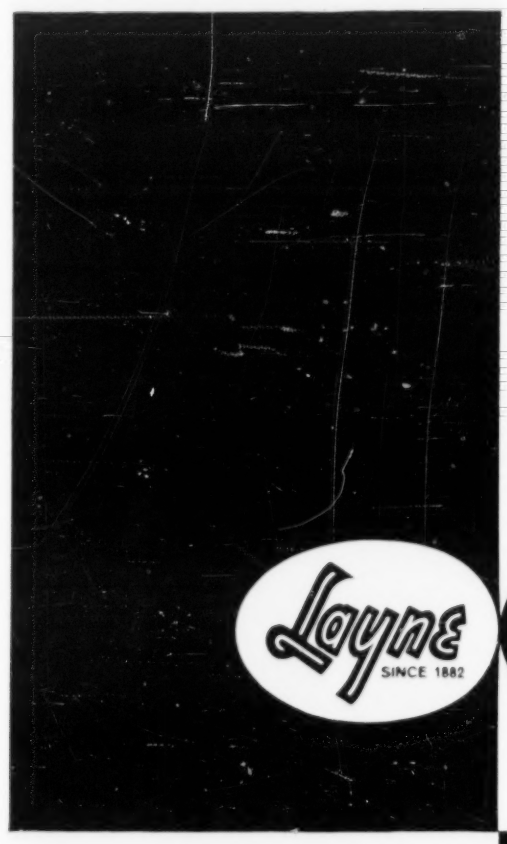
Foundation and Registered Seed distributed from Rice Branch Experiment Station for seeding in Arkansas in 1962.

PERFORMANCE

Arkansas Tests

In 21 replicated tests over the past 4 years at four locations in Arkansas, Northrose averaged appreciably higher in grain yields and showed much less lodging than Arkrose, Nato, and Zenith, currently available medium-grain varieties (see Table 2). Northrose averaged below Nato and Zenith but above Arkrose in per cent of head rice. When head rice yields were converted to pounds per acre, however, Northrose exceeded Arkrose and Zenith and averaged only 33 pounds less than Nato. Northrose averaged 169 pounds per acre more "second heads and brokens" than Nato, the value of which more than offsets the difference in head rice yields.

As indicated in Table 2, Northrose averaged 2 inches shorter than Nato and 7 to 8 inches shorter than Arkrose and Zenith in plant height. Na-



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to and Northrose averaged 132 days from seeding to maturity but ranged from 120 to 145 days, depending on date seeded and weather conditions.

The relatively new medium-grain variety Gulfrose was grown in 12 of the previously-mentioned tests and data from these 12 tests are shown in the lower half of Table 2. Northrose averaged considerably higher than Gulfrose in grain yield and yield of head rice per acre and showed much less lodging.

TABLE 2. Performance of Northrose and other medium-grain rice varieties grown at four locations in Arkansas, 1958-1961.

Variety	Grain yield (lb./A.)	Head rice yield (%)	Head rice yield (lb./A.)	Total mill yield (%)	Plant height (in.)	Lodging at maturity (%)	Period to mature (days)
Data from 21 replicated tests:							
Northrose	4518	64.0	2892	70.6	43	9	132
Arkrose	4365	62.6	2732	72.4	51	31	145
Nato	4166	70.2	2925	73.3	45	23	132
Zenith	4117	66.1	2721	71.5	50	24	134
Data from 12 replicated tests:							
Northrose	4518	64.0	2892	70.6	43	9	132
Arkrose	4449	65.4	2910	72.0	51	35	144
Nato	4379	70.2	3074	73.2	45	29	133
Zenith	4286	65.7	2816	71.4	50	28	134
Gulfrose	4234	64.5	2731	70.8	46	34	128

TABLE 3. Performance of Northrose and other medium-grain rice varieties at Beaumont, Texas; Crowley, Louisiana; Stoneville, Mississippi; and Suttgart, Arkansas; 1958-1961.*

Category and Location	Northrose	Nato	Zenith	Gulfrose
Grain yield (lb./A.)				
Beaumont	4158	3960	3973	3559
Crowley	3802	3384	3642	2802
Stoneville	5337	5364	4667	4749
Stuttgart	4933	4736	4689	4715
15-test average*	4558	4361	4243	3958
Head rice yield (%)				
Beaumont	62.0	65.6	59.8	65.8
Crowley	64.4	67.4	64.0	64.4
Stoneville	60.3	69.1	65.6	61.6
Stuttgart	65.9	69.5	67.0	65.6
15-test average	63.2	67.9	64.1	64.4
Head rice yield (lb./A.)				
Beaumont	2578	2598	2376	2342
Crowley	2448	2281	2331	1808
Stoneville	3218	3706	3062	2925
Stuttgart	3251	3292	3142	3093
15-test average	2881	2961	2720	2549
Total milled rice yield (lb./A.)				
Beaumont	2794	2732	2753	2452
Crowley	2589	2409	2528	1935
Stoneville	3640	3878	3258	3343
Stuttgart	3453	3462	3338	3352
15-test average	3118	3114	2763	2966
Plant height (in.)				
12-test average	43	46	49	45
Lodging (%)				
6-test average	5	31	(15)**	33
Days to maturity				
10-test average	126	126	127	120

*Data from 4 years' testing at 3 locations and from 3 years' testing at Stoneville.

**Data from additional tests indicate Zenith is similar to Nato in straw strength.

Uniform Yield Nurseries[3]

Northrose was grown in the cooperative Uniform Yield Nursery Group I at Beaumont, Texas, Crowley, Louisiana, and Stuttgart, Arkansas, during 1958-1961 and at Stoneville, Mississippi, during 1959-1961. Grain yields of Northrose exceeded those of Nato, Zenith and Gulfrose at all locations except Stoneville, where Nato showed a slight advantage (see Table 3). When converted to pounds per acre, head rice yields of Northrose averaged considerably above those of Zenith and Gulfrose but 80 pounds below the average for Nato. The total milled rice yields were almost identical for Northrose and Nato.

In 12 tests, Northrose averaged 3 inches shorter than Nato and 6 inches shorter than Zenith in plant height. Differential lodging occurred in six tests and Northrose showed an average of only 5 per cent lodging compared with 31 and 33 per cent, respectively, for Nato and Gulfrose. Northrose and Nato averaged the same number of days from seeding to maturity.

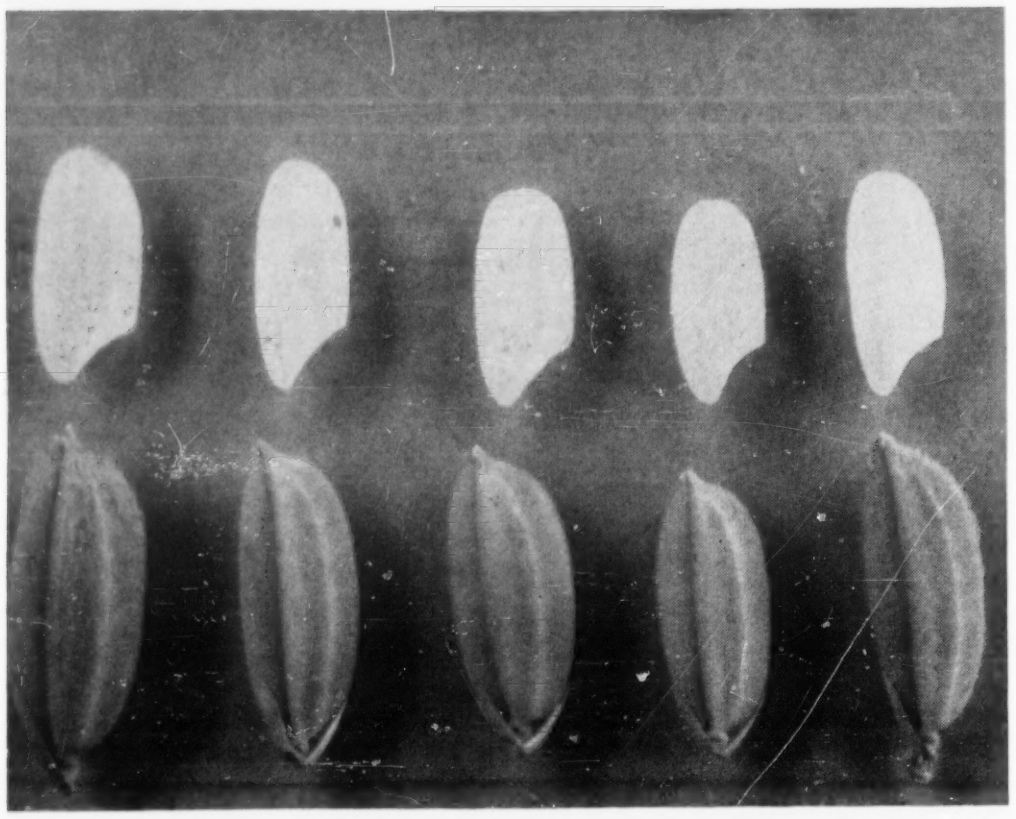
Since Northrose showed considerable chalkiness in the milled samples from some tests, it probably will not be recommended for growing outside Arkansas.

Outlying Observational Fields

Through cooperative arrangements with Ruel P. Nester, Extension Agronomist, Agricultural Extension Service, 11 observational "fields" of Northrose, mostly 1 acre in size, were grown in comparison with adjacent fields of Nato. Time of seeding, rate of fertilization and other cultural practices except rate of seeding, were essentially the same for the two varieties at a given location. In most cases Northrose was sown at a somewhat lower rate. These fields were observed a number of times during the growing season and several of the fields were included in local field days or tours. The names of cooperators who assisted in growing Northrose and Nato in these fields are listed in Table 4 on page 18.

The observational fields were harvested with standard farm equipment and approximate grain yields of the Northrose and adjacent Nato were obtained. Small samples were

[3]Data from Louisiana, Mississippi, and Texas were furnished through the courtesy of N. E. Jodon, Rice Experiment Station, Crowley, La.; H. R. Caffey, formerly Delta Branch Experiment Station, Stoneville, Mississippi; and H. M. Beachell, Rice-Pasture Experiment Station, Beaumont, Texas.



Grains of rough rice (paddy) and milled kernels of medium-grain rice varieties. Left to right: Arkrose, Gulfrose, Northrose, Nato and Zenith. Note that Northrose (center) is slightly larger than Nato (second from right).

saved for laboratory determination of milling yields. In most cases the grain yields of Northrose were slightly higher than those of Nato even thought the seeding rate for Northrose was lower. Estimated milling yields for the most part were comparable with those obtained from replicated experimental tests reported in Table 2.

Growers' reports on ease of combining of Northrose included "hard to combine," "threshes like Zenith," "similar to Roses," and "combines about like Nato." The Northrose on the Wofford farm in Poinsett County showed considerable breakage in combining as compared with Nato and produced low head rice yields. However, Northrose samples from an adjoining series of plots, which were hand-harvested at a relatively high moisture level, produced fairly high head rice yields.

Northrose (center), a selection from the cross between Lacrosse (left) and Arkrose (right), is earlier maturing and has shorter and stiffer straw than either parent.

QUALITY EVALUATION

Observations from the outlying plots and fields and from experiment station tests indicate that Northrose probably should be combined at about 23 to 24 per cent moisture. Also, it appears that Northrose should be combined and dried somewhat more carefully than Nato so as to prevent breakage. As indicated previously, Northrose tends to have slightly chalkier milled kernels, but it is believed that timely harvesting and proper drying may help decrease the amount of apparent chalkiness.

Cooperative tests conducted at Beaumont, Texas, by John Halick, formerly Cereal Chemist, and Bill D. Webb, Cereal Chemist, Crops Research Division, showed that Northrose is similar to Nato and other commercial medium-grain varieties in cooking and processing characteristics. Results from other cooperative tests indicate that Northrose has just as acceptable cooking and processing characteristics as Nato, and in a few cooking tests Northrose was preferred.

RESPONSE TO N-FERTILIZATION

Northrose was compared with Nato in a rate-and-timing-of-nitrogen fertilization experiment at the Rice Branch Station at Stuttgart in 1961. Rates included 75, 120, and 165 pounds of actual N per acre in single, double, and triple applications. Fertilizer was applied before first flood (14 days after seeding), before second flood (46 days), and as a "booster" application (68 days).

Northrose produced maximum grain and head rice yields (pounds per acre) at the 75-pound rate in contrast with Nato which required 120 pounds per acre of actual N to produce maximum grain and head rice yields (Table 5). Also, at the 75-pound rate, Northrose averaged only 16 per cent lodging compared with 76 per cent for Nato. When the grain yields from all three rates were averaged, the amount of rough rice produced by Northrose was significantly greater than that produced by Nato. Nato averaged 7.5 per cent higher head rice yields, but when these yields were converted to pounds per acre, the amount of head rice produced by Northrose at the 75-pound rate was equal to that pro-

(Continued on page 18)

FARM TALK AT THE FAMILY REUNION—

IN MY SECTION WE RAISE CORN. YOU NEVER SAW SUCH QUALITY AND HEAVY YIELDS! NATURALLY WE USE MATHIESON **UREA**.

YOO HOO!

WELL, IF IT ISN'T OUR COUSIN JOE! HOW'S YOUR COTTON CROP, JOE?

SINCE I BEGAN USIN' THIS **UREA** I GET RECORD-BUSTIN' YIELDS!. AND ***PROFITS!*** WELL, SUH, WHO'D WANT AN OIL WELL WHEN HE C'N FARM WITH **UREA** !!

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HEY! LISTEN TO THIS TELEGRAM FROM COUSIN ED: "SWITCHED TO MATHIESON **UREA** AND I'M TOO BUSY HARVESTING VEGETABLES TO SPARE TIME FOR A LI'L OL' PICNIC."

!

THAT'S UNCLE JIM! HE'S A WEALTHY CITRUS GROWER FROM FLORIDA!

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DOWN OUR WAY WE PRODUCE RICE. WE FOUND **UREA** THE BEST ADAPTED NITROGEN FERTILIZER FOR AIRPLANE APPLICATION, AND WE GET A BIGGER PAYLOAD PER FLIGHT. THIS REDUCES APPLICATION COSTS.

BY NEXT YEAR JIM WILL NEED A BODYGUARD!

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I EVEN SEEM TO CATCH BIGGER FISH WHEN TH' FISHIN' WORMS COME FROM **UREA**-TREATED SOIL!

YEAH, 'BO!

I DON'T MIND BEIN' TH' GREASED PIG FER FARMERS WHO USE **UREA** AND **AMMO-PHOS** FERTILIZERS!

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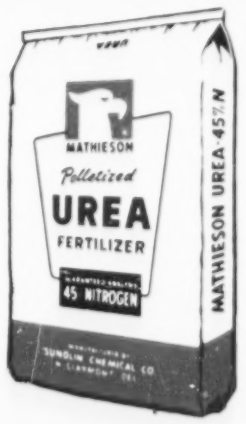

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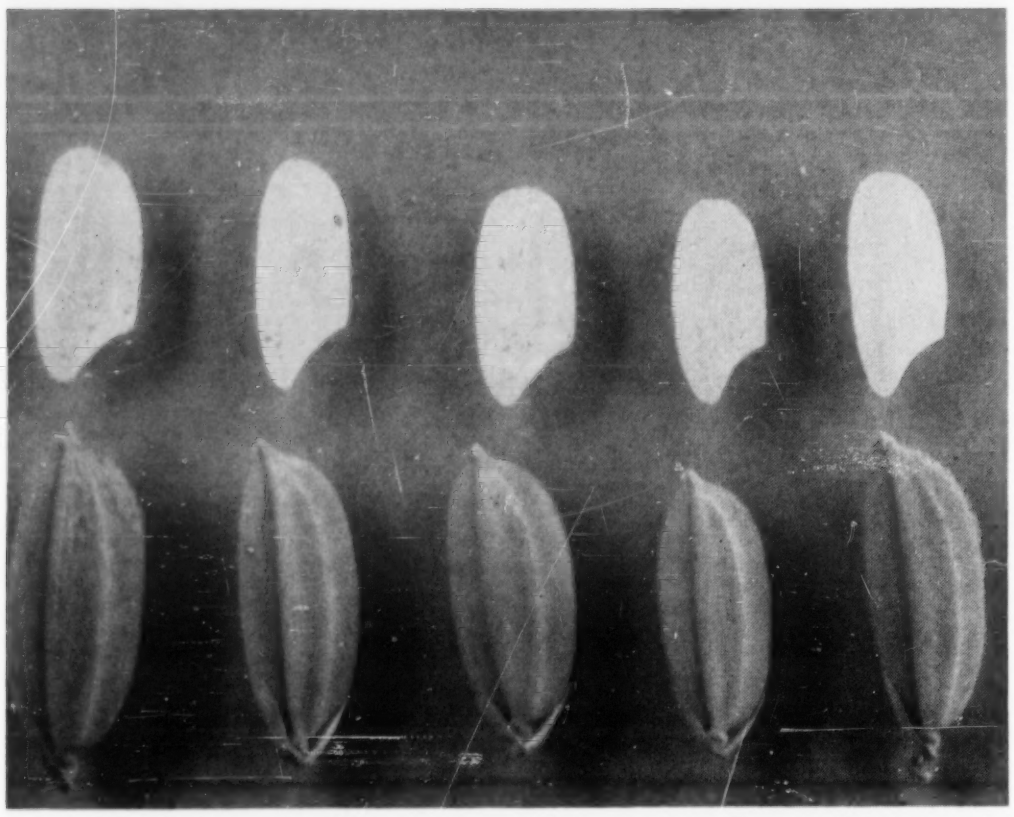

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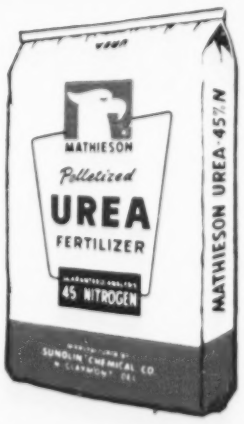

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Northrose . . . (continued from page 14)

TABLE 4. Cooperators who assisted in growing Northrose and Nato rice in outlying observational "fields" in Arkansas, 1961.

County	Location	Grower	Agric. Extension Service Personnel	Location
Green	O'Kean	John Getson	H. H. Hicks, co. agt. A. C. Layton, assoc. agt.	Paragould
Craighead	Jonesboro (West)	Joe Burns	H. Russel, co. agt. T. Cox, Assoc. agt. M. F. Appleberry, assoc. agt.	Jonesboro
Craighead	Gibson (Jonesboro)	Lowell Simpson-Crain Farms	H. Russell, et al.	Jonesboro
Craighead	Jonesboro (South)	Harold Housley	H. Russell, et al.	Jonesboro
Poinsett	Harrisburg	C. O. Wofford	J. Shults, co. agt. J. A. Cullins, assoc. agt. G. H. Beall, assoc. agt.	Harrisburg
Poinsett	Waldenburg	Jack Knapple	J. Shults, et al.	Harrisburg
Cross	Fair Oaks	Otto Loewer	T. Jennings, co. agt. S. D. Cullum, asst. agt.	Wynne
Lonoke	Carlisle	Ernest Bennett	H. E. Maxwell, co. agt. A. M. Swaty, assoc. agt.	Lonoke
Lonoke	Geridge	Harrison Watkins and Alfred Hildebrand	H. E. Maxwell, et al.	Lonoke
Jefferson	Wright Community	Wayne and Neal Bennett	R. W. Schroeder, co. agt. R. F. Ford, assoc. agt.	Pine Bluff
Arkansas	Almyra	Kenneth Jones	Henry Holly, co. agt.	Stuttgart

TABLE 5. Effect of rate of nitrogen topdressing on grain and head rice yields and lodging of Northrose and Nato rice, Stuttgart, Arkansas, 1961.

Rate of N-topdressing	Grain yield (lb./A.)		Head rice yield (lb./A.)		Lodging at Maturity (%)	
(lb./A.)	Northrose	Nato	Northrose	Nato	Northrose	Nato
75	5753	5130	4015	3878	16	76
120	5594	5298	3817	4018	43	84
165	5192	4900	3442	3676	75	90
Average	5513	5109	3756	3856	45	83

duced by Nato at the 120-pound rate.

The most striking results of this experiment are shown in the relative degree of lodging. Northrose averaged only 16 per cent lodging while producing its maximum grain yield whereas Nato averaged 84 per cent lodging for the treatment giving its highest grain yield.

Results from this and other experiments emphasize that Northrose apparently does not need high levels of soil fertility but can tolerate them. Data from this test indicate that topdressing treatments satisfactory for Nato seemingly are suitable for Northrose.

DISEASE REACTIONS

Northrose, along with Gulfrose and

TABLE 6. Straighthead readings and grain yields of Northrose and other rice varieties in straighthead tests at the Arkansas Southeast Branch Experiment Station, Kelso, 1958-1961.

Year of test	Northrose		Nato		Zenith		Gulfrose		Susceptible check***	
	Sthd.* (%)	Yield** (lb./A.)	Sthd. (%)	Yield (lb./A.)	Sthd. (%)	Yield (lb./A.)	Sthd. (%)	Yield (lb./A.)	Sthd. (%)	Yield (lb./A.)
1958	3	5092	7	4498	21	4251	—	—	94	558
1959	22	4553	3	4810	14	4500	—	—	87	2598
1960 Straighthead Variety Test	80	974	84	1080	90	207	—	—	100	0
1960 Kelso Variety Yield Test	22	5309	32	3504	44	3504	20	3343	91	360
1961	44	1574	16	3714	48	1772	80	1010	100	0
Average	34	3500	28	3521	43	2847	—	—	94	703

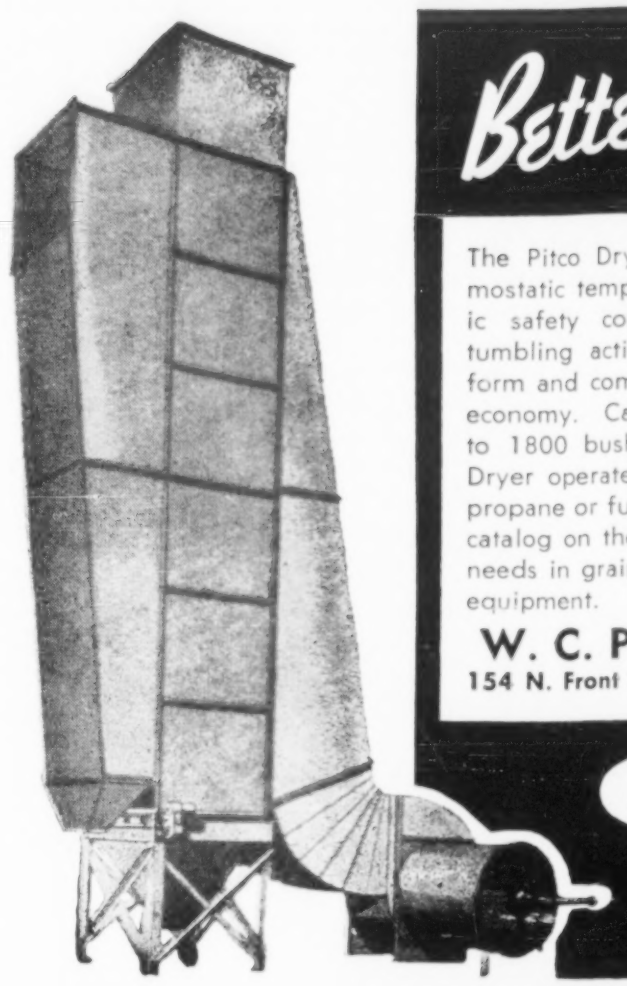
* Estimated damage from straighthead.
** Yields of rough rice.
*** Susceptible check Sunbonnet in four tests; Rexark in 1960 Kelso Variety Yield Test.

Arkrose, was resistant to hoja blanca, whereas Nato and Zenith were susceptible in tests conducted in Central and South America by the Crops Research Division and cooperating agencies.

Estimated straighthead damage and grain yields from straighthead tests at the Southeast Branch Experiment Station at Kelso, Arkansas, are given in Table 6. Averages for the five tests were almost identical for Northrose and Nato, whereas Zenith showed somewhat more damage. Straighthead was so severe in two of the tests that Sunbonnet, the susceptible check variety, produced no grain.

Northrose, as well as Arkrose and Nato, is susceptible to rotten-neck blast (caused by **Piricularia oryzae** Cav.) which may occur on newground or on land which has been used for growing fish and/or for a reservoir. Zenith and Gulfrose have shown resistance to the races of **Piricularia** found in Arkansas but have shown susceptibility to one or more races in Louisiana.[4] Also, in controlled greenhouse tests by Atkins, Northrose was susceptible to one race of **Piricularia** to which Nato was resistant.

[4]Communication from John G. Atkins, Plant Pathologist, Crops Research Division, Beaumont, Texas.



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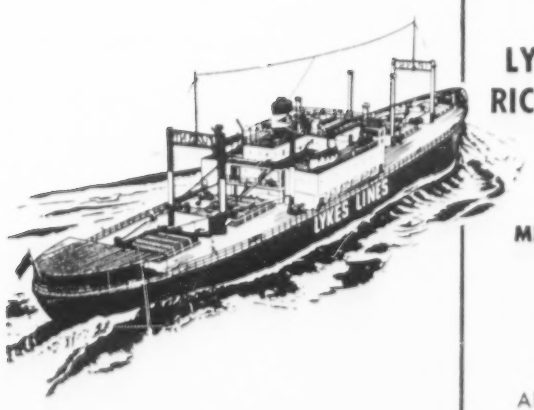

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